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3 December 1982

USSR: Astrakhan Natural Gas Project

- I. The Soviets in recent months have put development of the Astrakhan natural gas project on a fast track.
  - A. This project is scheduled to produce 3 billion cubic meters of gas a year by 1985 and probably could produce 30 to 60 billion cubic meters when development is completed around 1990--equal to about 10 percent of current Soviet gas output.
  - B. Negotiations with potential Western suppliers for some \$1.5 billion in pipe and equipment needed to develop the gas fields have intensified sharply since the summer of 1982; the Soviets hope to conclude most, if not all, of the contracts by early 1983.
  - C. The project was included in early versions of the 1981-85 economic plan and contracts were actively discussed with Western firms beginning in the late 1970s. It was put on a back burner, and apparently removed from the five year plan, in 1981 because of Moscow's concentration on the Yamal pipeline. With the Yamal project well in hand, the Astrakhan project was moved back into the plan and apparently now has top priority with Moscow among cooperative energy projects with West European firms.
  - D. The Western countries involved in bidding on the project,  are trying to find ways around the OECD consensus interest rate, mainly on the grounds that contract discussions started several year ago.
- II. Soviet geologists estimate that the Astrakhan fields--which are located north of the Caspian Sea in the Southern USSR (see map)--may contain up to 6 trillion cubic meters of gas, making it nearly as large as Urengoy.
  - A. Development of these gas reservoirs will be extremely difficult, however, since nearly 37 percent of the gas consists of noncombustible contaminants--about 25 percent hydrogen sulfide (H<sub>2</sub>S) and 12 percent carbon dioxide (CO<sub>2</sub>)--which are highly corrosive and hazardous to handle.
  - B. Moreover, the gas reservoirs are located at depths of more than 4,100 meters--twice as deep as those at

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Urengoy--with reservoir pressures of 630 atmospheres (9,300 psi) and temperatures of up to 150 degrees centigrade.

- III. The Astrakhan project is important to the USSR as a source not only of fuel but also of sulfur and other raw materials needed for expanding phosphate fertilizer and petrochemical production.
- A. Moscow wants to use Astrakhan natural gas to compensate for depleted gas-producing capacity at the vast Orenburg field and for replacement of output from North Caucasus gas reserves and output, which are nearing exhaustion.
  - B. Although intended primarily to meet domestic gas requirements, the Astrakhan fields could help to maintain Soviet gas exports to both Eastern and Western Europe via the Orenburg pipeline.
  - C. The Astrakhan project also includes ambitious plans for sulfur plants with a total capacity of about 3 million tons a year.
  - D. Although the USSR produces in excess of 11 million tons a year, second only to the United States, sulfur is in tight supply in the USSR.
  - E. Poland--which at one time provided about 7 percent of Soviet sulfur consumption--can no longer be counted on for sizeable deliveries; thus, the USSR has had to turn to Western countries to help meet its domestic needs.
  - F. In addition, the carbon dioxide removed from the gas will be transported via a 630-kilometer pipeline for injection into the Gur'yev oil fields to enhance oil recovery.
- IV. The Soviets will require Western equipment and technology to drill and equip the wells, construct gathering lines, and build gas-processing and refining plants.
- A. The hard currency cost is expected to be about \$1.5 billion, of which as much as \$650 million may be needed for special corrosion-resistant seamless tubular steel and large diameter pipe.
  - B. Future maintenance of the large gas complex also will require the procurement of Western equipment and technology.
- V. Negotiations for Western equipment which began in 1977 and had proceeded in a desultory fashion, have greatly picked up since the summer of 1982.
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- B. The Soviets have stipulated that US equipment is to be purchased only if it is unavailable elsewhere.
  - C. The Soviets say they want to sign some contracts before the end of 1982 and wrap up the remainder by the end of 1983. Such a pace would be unprecedented, but Moscow clearly is moving rapidly. Deliveries of [redacted] pipe for the Astrakhan project reportedly have begun.
- VI. The Soviets are pressing hard to obtain concessionary Western loans to finance imports of machinery and equipment for the project.
- A. Not surprisingly, Moscow is insisting on below market rates--specifically, they want to pay no more than the 7.8 percent rate obtained on Western government-guaranteed credits for the Yamal pipeline.
  - B. This rate is far below the OECD consensus rate of 12.4 percent and is even below the lowest recent non-subsidized rate on Western contracts with the USSR--a [redacted]
  - C. The Soviet tactics are having an effect: in an effort to win contracts, [redacted] and France reportedly are considering "grandfathering" the rate to 1981 or earlier, on the grounds that negotiations were well along at that time.
  - D. [redacted]

### The Astrakhan Natural Gas Project in Brief

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#### Development Stage

Up to 37 producing wells in the first stage, including 10 observation wells (eventually up to 2000 wells); well maintenance equipment. Cost \$100 million.

500-kilometer gas gathering system. Cost \$250-\$300 million.

Natural Gas Plant.  
Cost \$550-\$650 million.

#### Product Pipelines:

A 360-kilometer gas pipeline (Astrakhan-Kamush-Burun) to the North Caucasus.

A 580-kilometer condensate (natural gas liquids) pipeline to ship gas to petrochemical plants.

A 630-kilometer carbon dioxide (CO<sub>2</sub>) pipeline to the Gur'yev oil-fields for use in enhanced oil recovery. Cost \$350-\$450 million.

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#### Requirements for Western Goods

Special drill pipe; corrosion resistant, high-pressure blow-out preventors; casing and tubing; well-heads, christmas trees, and valves. Well maintenance equipment includes workover rigs, snubbing equipment and replacement casing and tubing with leakproof joints; special equipment tools and supplies to break out hydrate and sand plugs, and to prevent formation of same in producing gas wells. Three Western firms negotiating for subcontracts under the gas gathering system are located in the UK. Italian, West German and Mexican companies are also bidding.

Corrosion resistant linepipe for the collection manifolds and gathering lines along with associated computer systems and valves. In late November, three competing firms were in the bidding:

Equipment for removal and recovery of natural gas liquids, sulfur, and CO<sub>2</sub> from natural gas streams. The cost of the sulfur recovery plant alone may be as high as \$300 million while the cost of related pipe and tubes could be \$250-350 million. Numerous Western firms are competing for the contracts including Mannesmann, Sumitomo, Nippon Steel, Missoiwai, Marubeni Nichimen, ENI, Liurgi, and Creusot Loire.

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## USSR: The Astrakhan' Natural Gas Project (U)

Having secured Western assistance in developing the Siberia-to-Western Europe gas pipeline, Moscow is again turning to the West for equipment to develop its natural gas reserves at Astrakhan'. Astrakhan' gas, however, will be used primarily for domestic purposes rather than export. A revitalized Soviet interest in developing the Astrakhan' deposit reflects the USSR's need to restore gas supply to the Caucasus region following the cutoff of Iranian gas in 1979, to increase chemical fertilizer production, and to activate backup capacity for the Soyuz export pipeline. (C)

Negotiations with potential Western suppliers for \$1.5 billion worth of pipe and equipment needed to develop the gasfields have accelerated since the summer of 1982; the Soviets—perhaps optimistically—hope to conclude most if not all of the contracts early this year. The Western countries involved in the bidding are considering ways of accommodating Soviet demands for highly concessionary interest rates. (C)

## Dimensions of the Project

Soviet geologists estimate that the Astrakhan' gasfield may contain up to 6 trillion cubic meters of gas, making it nearly as large as the one at Urengoy. When brought on stream, the project could eventually produce 30-60 billion cubic meters of gas, nearly 3 million tons of sulfur, and 1.8 million tons of stable condensate annually. The sulfur and condensate will be used as feedstock for chemical plants. The Soviets were forced to halt deep exploratory drilling at Astrakhan' in the late 1970s because they lacked sulfur-resistant tubing, casing, and drill pipe. (C)

Development of the Astrakhan' gas reservoirs will be extremely difficult and time consuming. Over

one-third of the gas consists of noxious, noncombustible contaminants—about 25 percent hydrogen sulfide and 12 percent carbon dioxide—which are highly corrosive and hazardous. Moreover, the gas reservoirs are located at depths of more than 4,100 meters—twice as deep as those at Urengoy—with extremely high reservoir pressures of 630 atmospheres (9,300 psi) and temperatures of up to 150 degrees Celsius. (U)

## The Need for Western Technology

The Soviets will require substantial Western equipment and technology to ultimately drill and equip some 2,000 wells, construct gathering systems, and build gas-processing and sulfur recovery plants to develop the Astrakhan' deposits. We expect the hard currency cost to be about \$1.5 billion, of which as much as \$650 million may be needed for special corrosion-resistant seamless tubular steel and large-diameter pipe. About \$100 million is to be spent on well equipment, \$250-300 million on the gathering system, and perhaps \$550-650 million on the gas and sulfur processing plants. An additional \$350-450 million could be spent on pipeline construction. Maintenance of the gas complex will be tied to the procurement of Western equipment and technology. (C)

## The Western Players

Negotiations for Western equipment began in 1977 and continued sporadically over the next four years. Field development that had been scheduled for the 1981-85 Plan was canceled but has since been reinstated

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### The Astrakhan' Natural Gas Project in Brief

Development Stage	Requirements for Western Goods
Up to 66 producing wells in the two stages, including 10 observation wells (eventually up to 2,000 wells); well maintenance equipment. <i>Cost: \$100 million</i>	Special drill pipe; corrosion-resistant, high-pressure blowout preventers; casing and tubing; well-heads, Christmas trees, and valves. Well maintenance equipment includes workover rigs, snubbing equipment, and replacement casing and tubing with leakproof joints; special equipment tools and supplies to break out hydrate and sand plugs, and to prevent formation of same in producing gas wells. Three Western firms negotiating for subcontracts under the gas-gathering system are located in the United Kingdom. Italian, West German, and Mexican companies also are bidding. Some US investment is likely.
500-kilometer gas-gathering system. <i>Cost: \$250-300 million</i>	Corrosion-resistant linepipe for the collection manifolds and gathering lines along with associated computer systems and valves. In late November, three competing firms were in the bidding.

At least 15 major Western firms reportedly are vying for Astrakhan' contracts. A French consortium led by Technip signed a \$400 million contract for the gas plant and related pipe and tubes on 21 December 1982. Recent reporting indicates that the West German firm Mannesmann has won a contract for the gas-gathering system, but no details on the terms are available. (C)

In their negotiations with the West European and Japanese firms, the Soviets have stipulated that equipment is to be purchased from the United States only if it is unavailable elsewhere. Some US equipment and special corrosion resistant seamless tubular steel are likely to be needed. (C)

### Financing the Project

The Soviets are pressing hard to obtain concessionary Western loans. They would probably balk at interest rates over the 7.8 percent obtained on Western government-backed credits for equipment for the new Siberia-to-Western Europe natural gas pipeline. (C)

The Western governments are complaining that they are being whipsawed between a desire for their firms to win contracts and the wish to at least appear not to be straying too far from the OECD interest rate consensus. In July 1982 the OECD countries agreed to fix minimum interest rates to be charged on official lending to the USSR at 12.4 percent for high interest rate countries and at 0.3 percentage point above the long-term domestic market rate for low-interest-rate countries. (C)

<sup>1</sup> With the momentum of the Astrakhan' negotiations well under way, Soviet negotiators reportedly are now moving ahead with discussions on other sour gas projects—at Karashaganak roughly 120 kilometers southwest of Orenburg and at Tengiz some 500 kilometers east of Astrakhan'. (S NF)

Production pipelines:  
A 360-kilometer gas pipeline (Astrakhan'-Kamush-Burun) to the North Caucasus.  
A 580-kilometer condensate pipeline to transport natural gas liquids to petrochemical plants.  
A 630-kilometer carbon dioxide pipeline to the Gur'yev oilfields for use in enhanced oil recovery.  
*Cost: \$350-450 million*

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In an attempt to get around the new OECD consensus guidelines, the Western countries have been considering "grandfathering" offered rates to earlier periods and—in some cases—raising equipment prices to compensate for reduced interest rates.

We have little information on the repayment terms for the Astrakhan' credits, but Moscow probably will attempt to procure terms of eight years or more with an initial grace period. The OECD consensus agreed to in July stipulated that no East European country would be eligible for credits of more than eight and a half years. Financing of machinery and equipment for the Siberia-to-Western Europe pipeline included credits with repayment periods over eight years after an initial three-year grace period on repayment of principal. In the case of financing for pipe, it is likely that the Western lenders will insist on annual negotiations and will not offer repayment periods of more than five years. (C)

#### Benefits to the USSR

The Astrakhan' project is important to the USSR as a source of additional gas and sulfur and natural gas liquids needed for expanding production of

fertilizers and petrochemicals. Kremlin leaders want to use Astrakhan' natural gas to compensate for depleted gas-producing capacity at the vast Orenburg field and to replenish nearly exhausted supplies in the Transcaucasus and North Caucasus. Iranian gas was being imported at the rate of 10 billion cubic meters a year when shipments were halted in 1979. Natural gas from Astrakhan' could flow at a rate of 3 billion cubic meters a year by 1985 and perhaps 30 billion to 60 billion cubic meters a year by 1990. Present Soviet output of natural gas is about 495 billion cubic meters a year. (C)

Although intended primarily to fill domestic gas requirements, the Astrakhan' fields will help maintain Soviet gas exports to both Eastern and Western Europe via the Orenburg pipeline by making up for any production decline elsewhere. At present, the Orenburg line carries some 16 billion cubic meters a year to Eastern Europe, and it could carry another 13 billion cubic meters to Western Europe. In 1981, hard currency receipts from sales of gas totaled \$4 billion, or about 15 percent of total Soviet commodity export earnings. (C)

When the new Siberia-to-Western Europe pipeline is completed, the Astrakhan' project will give the Soviets even greater flexibility to maintain or—as has been hinted—to increase gas exports to Eastern and Western Europe. An offer of stepped-up gas deliveries would help offset the impact of cutbacks in oil shipments to Czechoslovakia, East Germany, and Hungary. (C)

The Astrakhan' project includes ambitious plans for sulfur production of about 3 million tons a year, larger than any sulfur complex in the world. Although the USSR, with an output in excess of 11 million tons, is second only to the United States in production, sulfur is in tight supply in the USSR. Because there are few large reserves of sulfur suitable for mining, the Soviets are turning increasingly to recovery of byproduct sulfur from sour gas, oil, metal smelters, and possibly coal. Moreover,

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Poland—which in 1980 provided about 7 percent of Soviet sulfur consumption—cannot be counted on for large increases in deliveries. Thus, the USSR has had to turn to Western countries to help meet its domestic needs. (C)

Finally, the project is expected to make available 1.8 million tons of stable condensate for feedstocks at petrochemical plants. In addition, the carbon dioxide recovered from the gas will be transported via a 630-kilometer pipeline for injection into the Gur'yev oilfields to enhance oil recovery. (C)

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